

AMENDMENTS TO THE CLAIMS

This Listing of Claims will replace all prior versions, listing, of claims in the specification.

LISTING OF CLAIMS:

Claim 1 (withdrawn) A polymer solution containing cross-linking agent, comprising: a polysaccharide; a cross-linking agent having at least one X group and at least one Y group, wherein at least one of said at least one X group is bonded to said polysaccharide, and at least one of said at least one Y group is hydrolyzed; the general formula of said cross-linking agent is  $X_{m1}-Z-Y_{n1}$ , wherein both m and n are integers, m1, n1 and an acid solution, said acid solution dissolves said polysaccharide and catalyzes the hydrolyzed Y groups, so that the hydrolyzed Y groups dehydrate and combine with each other to form cross-linking structure.

Claim 2 (withdrawn) The polymer solution according to claim 1, wherein said polysaccharide is ether any one or any combination of the following: guar gum, guar ether, starch, starch ether, xanthan gum, dextran and chitosan.

Claim 3 (withdrawn) The polymer solution according to claim 1, wherein at least one said X group further comprises: 12

Claim 4 (withdrawn) The polymer solution according to claim 1, wherein at least one said X group further comprises: 13R is an alkyl group.

Claim 5 (withdrawn) The polymer solution according to claim 1, wherein at least one said Y group comprises alkoxide of 1 to 10 carbon atoms.

Claim 6 (withdrawn) The polymer solution according to claim 1, wherein said Z group is silicon, tin, titanium, or zirconium.

Claim 7 (withdrawn) The polymer solution according to claim 6, wherein said cross-linking agent further comprises 3-glycidoxypentyl-trimethoxysilane GPTMS.

Claim 8 (withdrawn) The polymer solution according to claim 7, wherein the content of GPTMS is about 0.5 wt % to 70 wt % of said polysaccharide.

Claim 9 (withdrawn) The polymer solution according to claim 1, wherein said Z group bonds to at least one alkyl group.

Claim 10 (withdrawn) The polymer solution according to claim 1, wherein said Z group is a group containing nitrogen atoms.

Claim 11 (withdrawn) The polymer solution according to claim 10, wherein said nitrogen atoms-containing group further comprises a structure as follows: 14

Claim 12 (withdrawn) A method for forming a membrane having cross-linking structure, comprising: providing a polysaccharide; dissolving said polysaccharide by an acid solution for forming a feed; providing a cross-linking agent having at least one X group and at least one Y group, wherein at least one of said at least one X group is bonded to said polysaccharide, and at least one of said

at least one Y group is hydrolyzed; the general formula of said cross-linking agent is  $X_{\text{sub.m}}-Z-Y_{\text{sub.n}}$ , wherein both m and n are integers, m1, n1 and mixing said feed and said cross-linking agent to form a casting solution, wherein at least one of said at least one X group of said cross-linking agent is bonded to a specific functional group of said polysaccharide, and at least one of said at least one Y group is hydrolyzed to form a hydroxyl group; and performing a membrane fabricating process by said casting solution for forming a membrane having cross-linking structure, wherein the acid in said casting solution catalyzes the hydroxyl groups, so that the hydroxyl groups dehydrate and combine with each other to form said cross-linking structure.

Claim 13 (withdrawn) The method according to claim 12, wherein said polysaccharide is either any one or any combination of the following: guar gum, guar ether, starch, starch ether, xanthan gum, dextran, chitosan and their combination.

Claim 14 (withdrawn) The method according to claim 12, wherein at least one said X group further comprises: 15

Claim 15 (withdrawn) The method according to claim 12, wherein at least one said X group further comprises: 16R is an alkyl group.

Claim 16 (withdrawn) The method according to claim 12, wherein at least one said Y group comprises alkoxide of 1 to 10 carbon atoms.

Claim 17 (withdrawn) The method according to claim 12, wherein said Z group is silicon, tin, titanium, or zirconium.

Claim 18 (withdrawn) The method according to claim 17, wherein said cross-linking agent further comprises 3-glycidoxypopyl-trimethoxysilane GPTMS.

Claim 19 (withdrawn) The method according to claim 18, wherein the content of GPTMS is about 0.5 wt % to 70 wt % of said polysaccharide.

Claim 20 (withdrawn) The method according to claim 12, wherein said Z group bonds to at least one alkyl group.

Claim 21 (withdrawn) The method according to claim 12, wherein said Z group is a group contains nitrogen atoms.

Claim 22 (withdrawn) The method according to claim 21, wherein said nitrogen atoms-containing group further comprises a structure as follows: 17

Claim 23 (withdrawn) The method according to claim 12, wherein said specific functional group is amine, hydroxyl or carboxyl.

Claim 24 (withdrawn) The method according to claim 12, when said polysaccharide is chitosan, at least one said X group of said cross-linking agent bonds to the amine group of chitosan.

Claim 25 (withdrawn) The method according to claim 12, wherein said membrane fabricating process further comprises a temperature raising process to accelerate the hydrolysis of the Y groups and the dehydrating-combining reaction, so as to form said membrane having cross-linking structure.

Claim 26 (withdrawn) The method according to claim 25, wherein said temperature raising process comprises at least one heating step wherein after each heating step, the temperature is remained for a period of time before another heating step is performed.

Claim 27 (withdrawn) The method according to claim 25, when said polysaccharide is chitosan, the temperature range of said temperature raising process is 10 to 170.

Claim 28 (withdrawn) The method according to claim 12, wherein a fixation process is performed after said membrane fabricating process, and said fixation process comprises: performing a neutralization process by a alkaline solution for neutralizing said membrane having cross-linking structure and a by-product of neutralization is formed after said neutralization process; removing said by-product of neutralization by a cleaning agent from said membrane having cross-linking structure; and performing a drying process for removing said cleaning agent from said membrane having cross-linking structure.

Claim 29 (withdrawn) The method according to claim 12, wherein an acid-removing process is performed after said membrane fabricating process, and said acid-removing process comprises: removing the acid by a cleaning agent from said

membrane having cross-linking structure; and performing a drying process for removing said cleaning agent from said membrane having cross-linking structure.

Claim 30 (original) A material having cross-linking structure, comprising: a modified substrate containing chitosan; and a plurality of bridges formed on said modified substrate, wherein said plurality of bridges bond to the amine group of chitosan, and said plurality of bridges bond to each other so as to form the cross-linking structure; said plurality of bridges are formed by a cross-linking agent having at least one X group and at least one Y group, wherein at least one said X group can bond to chitosan, and at least one said Y group can be hydrolyzed, so that the hydrolyzed Y groups combine each other to form said plurality of bridges; the general formula of said cross-linking agent is  $X_{\text{sub.m}}-Z-Y_{\text{sub.n}}$ , wherein both m and n are integers,  $m \geq 1$ ,  $n \geq 1$ .

Claim 31 (original) The material according to claim 30, wherein the method for forming said plurality of bridges is dehydrating-combining reaction by said cross-linking agent.

Claim 32 (original) The material according to claim 30, wherein at least one said X group further comprises: 18

Claim 33 (original) The material according to claim 30, wherein at least one said X group further comprises: 19 R is an alkyl group.

Claim 34 (original) The material according to claim 30, wherein at least one said Y group comprises alkoxide of 1 to 10 carbon atoms.

Claim 35 (original) The material according to claim 30, wherein said Z group is silicon, tin, titanium, or zirconium.

Claim 36 (original) The material according to claim 35, wherein said cross-linking agent further comprises 3-glycidoxypentyl-trimethoxysilane GPTMS.

Claim 37 (original) The material according to claim 36, wherein the content of GPTMS is about 0.5 wt % to 70 wt % of the chitosan.

Claim 38 (original) The material according to claim 30, wherein said Z group bonds to at least one alkyl group.

Claim 39 (original) The material according to claim 30, wherein said Z group is a group contains nitrogen atoms.

Claim 40 (original) The material according to claim 39, wherein said nitrogen atoms-containing group further comprises a structure as follows: 20